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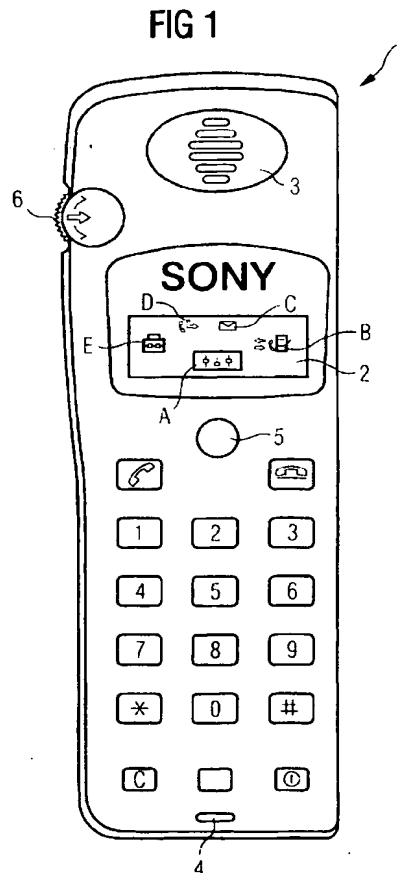
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(54) Terminal for wireless telecommunication and method for displaying icons on a display of such a terminal

(57) The present invention relates to a terminal (1) for wireless telecommunication and to a method for displaying icons on a display means (2) of the terminal (1) for wireless telecommunication. The terminal (1) for wireless telecommunication according to the present invention comprises display means (2) for displaying icons corresponding to menu items and other information, scroll means (6), for example a jog dial, for scrolling through icons and highlighting a respective selected icon, and an enter means (5) for entering a respective highlighted icon to chose the corresponding menu item. At least some of all available icons of the menu are displayed on the display means (2) at the same time and the scroll means (6) can be actuated to scroll through the icons in at least two directions so that the respective selected icon is highlighted depending on the actuation of the scroll means (6). The respective selected icon is displayed enlarged in relation to the other displayed icons, whereby the icons are displayed enlarged in their successive order in one of the at least two directions depending on the actuation of the scroll means (6). The present invention thereby enables the very clear and unambiguous display of icons even on small displays, for example on portable telephones.



## Description

[0001] The present invention relates to a terminal for wireless telecommunication and a method for displaying icons on a display means of such a terminal.

[0002] Terminals for wireless telecommunication are for example base stations or mobile stations of a telecommunication system. The mobile stations can be a portable telephone or some other portable electronic device comprising the possibility of sending and receiving information in a wireless telecommunication system.

[0003] The present invention relates particularly to terminals for wireless telecommunication, which comprise display means for displaying icons corresponding to menu items and other information. Icons are symbols or pictures used to visualize selectable menu items. If a menu has for example three submenus or three subfunctions to select, these submenus or subfunctions could be visualized by three different icons. Usually, the icons replace the corresponding text display of a term or an expression describing the respective menu item, so that the icons can be used independently from the chosen user language.

[0004] Many different portable telephones having displays for displaying icons are presently on the market. A portable telephone sold by Alcatel and named "One touch pocket" for example has a display means for displaying icons corresponding to menu items, scroll means for scrolling through icons and several enter means for entering a respective icon to choose the corresponding menu item. The scroll means is a key having arrows which indicate the two directions in which the icons can be scrolled through. The display thereby shows three icons adjacent to each other on a horizontal line. Scrolling upwardly and downwardly, the display shows the three respective succeeding icons. Under the display, three enter keys are located, which are respectively allocated to one of the shown three icons. In other word, the menu item corresponding to one of the displayed icons can be selected and entered by pressing the respective key allocated to the respective icon.

[0005] A portable telephone sold by SONY under the name "Z1 Plus" comprises a display means for displaying icons corresponding to menu items and other information, a scroll means for scrolling through icons and highlighting a respective selected icon, and an enter means for entering a respective highlighted icon to choose the corresponding menu icon, whereby at least some of all available icons of a menu are displayed on the display at the same time and whereby the scroll means can be actuated to scroll through the icons in two directions so that the respective selected icon is highlighted depending on the actuation of the scroll means. The scroll means is a rotational key (jog dial), which can be turned clockwise or counterclockwise to scroll through the displayed icons and to select one of them. In each menu, three icons are displayed at the same time adjacent to each other on a horizontal line on the

display. The selected one of the three displayed icons is highlighted by means of an inverted or negative display of the respective icon. The respective menu item of the highlighted icon can be entered by pressing an enter key. Only a single enter key needs to be provided. By turning the rotational key the three displayed icons are successively highlighted in the respective direction. In case that one of the icons on the left or the right side of display is highlighted and the rotational key is turned in the direction corresponding to the next successive icon, which is not displayed, the next succeeding three icons are displayed on the display. In other words, the icons are displayed blockwise on the display. By scrolling successively through the icons of the menu, the display shows the respective groups of three icons in succession, whereby the three displayed icons are highlighted and thus selected one after the other so that, when a new group of three icons is shown, the next successive highlighted icon is the one located on the opposite side of the preceding highlighted icon.

[0006] Although the last solution has the advantage that only one enter key is necessary compared to three as in the above-described Alcatel portable phone, it is not obvious in which direction the icons are going to be highlighted and the blockwise movement of the icons will take place, particularly when a rotational key (jog dial) is used. Especially since the displays on portable devices are usually small, usually not all available icons of a menu can be displayed on the display at the same time. Thus it is not obvious for a user, what the remaining non-displayed icons of the menu are and how to reach them. Further, the inversion of the icons is sometimes not a clear indication for a user, that this is the icon that can be selected, since the inversion of an icon often leads to a confusing or perturbing image.

[0007] The object of the present invention is therefore to provide a terminal for wireless telecommunication and a method for displaying icons on a display means of a terminal for wireless telecommunication, which provide for a clear and unambiguous way of highlighting a selected icon and allow at the same time a large number of icons of a menu to be displayed on the display means at the same time.

[0008] This object is achieved by a terminal for wireless telecommunication according to claim 1, which is characterized in that the respective selected icon is displayed enlarged in relation to the other displayed icons, whereby the icons are displayed enlarged in their successive order in one of the at least two directions depending on the actuation of the scroll means.

[0009] The above object is further achieved by a method for displaying icons on a display of a terminal for wireless telecommunication, which is characterized in that the respective selected icon is displayed enlarged in relation to the other displayed icons, whereby the icons are displayed enlarged in their successive order in one of the at least two directions depending on the actuation of the scroll means.

**[0010]** According to the present invention, the respective selected icon is displayed enlarged, which means that the other displayed icons are displayed with a smaller size, so that more icons than in known devices can be displayed on the display at the same time. Further, the respective selected icon can thus be displayed in more detail, so that the user gets a clear and unambiguous information on the corresponding selected menu item. Since the not selected icons are displayed smaller, more and in most cases all available icons of a menu can be displayed on the display, so that the user always has an overlook over all possible options. By displaying the icons enlarged in their successive order in one of the at least two directions depending of the actuation of the scroll means, a clear and unambiguous allocation of the actuation direction of the scroll means and the order of the successive enlarged display of the selected icons can be assured.

**[0011]** Advantageously, the icons are displayed in a circular arrangement. The circular arrangement allows a clearly visible allocation of the actuation direction of the scroll means to the successive enlargement of the selected icons. This is particularly true when the scroll means is a rotatable key (jog dial). Also, the icons could be arranged in a matrix and scrolled through line by line.

**[0012]** Further advantageously, by actuating the scroll means, the displayed icons successively change their position so that the enlarged display of a selected icon is always located at the same position on the display means. This means, by actuating the scroll means, the displayed icons move through the predetermined positions, whereby always the icon on a particular predetermined position is enlarged. Thereby, the user does not need to look around the display to find the enlarged icon, but can always be sure to find the enlarged and thus selected icon on the same position of the display. Advantageously, the position of the enlarged display icon is thereby located on a central position of the area of the display, in which the icons are displayed. The central area of the display is always the first area, onto which a user looks, so that the selected icon can be found even more quickly. Alternatively, the icons could maintain their position and be enlarged one after the other by actuation of the scroll means.

**[0013]** It is further advantageous, when the preceding and the succeeding icon to the actually selected icon are displayed enlarged in relation to the other displayed icons but smaller than the actually selectable icon. This means, that the two icons adjacent to the enlarged icon have a size between the enlarged icon and the other displayed icons. Hereby the user gets a more detailed and clearer information about the next icon which is selectable. Particularly in connection with the circular arrangement of the icons, a three-dimensional effect can be achieved, when the enlarged icon is shown on the bottom, the small icons are shown on the top and the middle sized icons are shown on the left and on the right side of the display. Thus, the small icons on the top ap-

pear to be far away, the enlarged icon on the bottom appears to be the nearest and the mid-size icons on the left and on the right side appear to be located in a semi-distance. Particularly in case that the display is a graphical display with a high resolution, a very smooth and visually appealing rotation motion of the icons can be realised.

**[0014]** Advantageously, the scroll means is a jog dial which can be rotated to scroll through the icons. A jog dial is a rotatable key, which is easy to handle and which provides a clear and unambiguous allocation of the actuation direction of the jog dial to the moving direction of the icons on the display. Particularly in case of the circular arrangement of the icons, a clockwise rotation of the jog dial advantageously results in a clockwise movement of the icons, and a counterclockwise rotation of the jog dial results in a counterclockwise movement of the icons, so that the user knows exactly, in which direction to turn the jog dial to arrive at the icon he wishes to choose.

**[0015]** Further advantageously, a text display of the menu item of the respective selected icon on the display is shown close to the position of the selected icon. Hereby, additional information is provided for a user, in case he/she does not know the meaning of the icons very well and to enable a quicker understanding of the selected menu items.

**[0016]** The present invention is particularly advantageous for small terminals, for example portable telephones, which have small displays.

**[0017]** It is to be understood that also more than one icon can be selected and highlighted at the same time, whereby one enter key for each highlighted icon is advantageously provided. For example, three icons can be highlighted at the same time and three corresponding enter keys can be provided, which can be pressed to enter the corresponding menu item.

**[0018]** According to a further aspect of the present invention, a terminal for wireless telecommunication is provided, with a display means for displaying icons corresponding to menu items and other information, a scroll means for scrolling through icons and highlighting the respective selected icon, and an enter means for entering a respective highlighted icon to choose the corresponding menu item, whereby at least some of all available icons of a menu are displayed on the display at the same time and whereby the scroll means can be actuated to scroll through the icons in at least two directions so that the respective selected icon is highlighted depending on the actuation of the scroll means, characterized in that by actuating the scroll means the displayed icons successively change their position so that the enlarged display of a selected icon is always located at the same position on the display. This aspect of the present invention further comprises a corresponding method for displaying icons on a display of such a terminal for wireless telecommunication.

**[0019]** This further aspect of the present invention has

an advantage in that the respective selected and highlighted icon is always located on the same position of the display, so that the user does not need to look for the highlighted icon on the display. Advantageously, the position of the highlighted icon is located on a central position of the area of the display in which the icons are displayed. This is particularly advantageous, since the users tend to look always to the center of a display first. Further advantageously, the icons are displayed in a circular arrangement. Thereby, the user can gain a quick and cleaner overlook over the icons available in a menu. Further, the scroll means can be a jog dial, which can be rotated to scroll through the icons. Particularly in connection with the circular arrangement of the icons, a clear and unambiguous allocation of the rotation direction of the jog dial to the rotation direction of the icons is ensured. Further, a text display of the menu item of the respective selected icon on the display closed to the position of the selected icon can be provided.

**[0020]** In the following description, the present invention is explained in more detail by means of a preferred embodiment relating to the enclosed drawings, in which

Figure 1 shows a schematic top view of an embodiment of a terminal for wireless telecommunication according to the present invention, namely a portable telephone,

Figure 2 shows an enlarged view of the display of the portable telephone shown in Figure 1 with a first example of displayed icons,

Figure 3 shows an enlarged view of the display of the portable telephone shown in Figure 1 with a second example of displayed icons,

Figure 4 shows an enlarged view of the display of the portable telephone shown in Figure 1 with a third example of displayed icons,

Figure 5 shows the display shown in Figure 2, whereby a text display of the enlarged menu icon is added,

Figure 6 shows the display of Figure 3, whereby a text display of the menu item of the enlarged icon is added, and

Figure 7 shows the display of Figure 4, whereby a text display of the menu item of the enlarged icon is added.

**[0021]** Figure 1 shows a schematic top view of a portable telephone 1 for wireless telecommunication according to the present invention. The portable telephone 1 comprises a display 2, on which icons corresponding to menu items and other information, such as text information, can be displayed. The portable telephone 1 further comprises a loudspeaker 3 on the upper front part and a microphone 4 on the lower front part of the casing. Further, an enter key 5 as enter means for entering a respective menu item or function is provided. The portable telephone 1 further comprises the usual number keys, the pound key, the power on/off key and so on.

The jog dial 6 is provided on an upper sidepart of the portable telephone 1. The jog dial 6 is a rotatable key, a part of which is exposed to the outside. The exposed part can be touched by the finger of a users hand and can be rotated clockwise (upwardly) or counterclockwise (downwardly) to scroll through menu items or functions displayed on the display 2.

**[0022]** The menu items or functions can be displayed as text display or as icons on the display 2. The text display is for example a term or an expression written in characters and explaining the meaning of the respective function or menu item. An icon is a graphical display of a symbol, which stands for the respective menu item or for the respective other function, of the respective device.

**[0023]** Preferably, the display 2 of the portable telephone 1 is a graphical display, which has a much higher resolution than usual text or character displays, and allows a visually attractive display of a smooth rotation movement of the icons.

**[0024]** The display 2 of the portable telephone 1 illustrated in Figure 1 shows five icons on five different positions A, B, C, D and E. Each displayed icon corresponds to the menu item of a menu. Since each icon visualizes the respective meaning of the menu item, the icons can be used independent of the selected user language of the telephone.

**[0025]** The icon on position A is enlarged compared to the other displayed icons. This means, that the icon on position A is selected and highlighted so that the respective menu item can be entered by pressing the enter key 5. All five shown icons are arranged in a circular arrangement on the display 2, whereby a three-dimensional effect is achieved by positioning the enlarged icon on position A which is the position on the bottom center of the display 2. The two icons located on positions C and D are the smallest icons displayed. Positions C and D are located on the top of the display 2. The icons located on positions B and E have a middle size between the small size of the icons at positions C and D and the enlarged size of the icon on position A. Positions B and E are approximately on a middle horizontal line of the display 2 on the right and left hand side of the display 2. Since the icon on position A is the biggest displayed icon, it appears to be "in front", whereby the icons on positions C and D appear to be "in back" of the display.

**[0026]** In Figure 2, the display 2 is shown in an enlarged view. The icons of the display in figure 2 are arranged in the same manner as in figure 1. The icon on position A corresponds to the menu item "control", the icon on position B corresponds to the menu item "redial list", the icon on position C corresponds to the menu item "messaging", the icon on position D corresponds to the menu item "divert" and the icon on position E corresponds to the menu item "preferences". Since the icon "control" is shown enlarged on position A, the menu item "control" is selected and can be entered by pressing the enter key 5 of the portable telephone 1.

[0027] Figure 3 shows a second example of the arrangement of the five icons shown in figure 2. In the display 2 shown in figure 3, the icon of the menu item "preferences" is shown enlarged on position A. Thus, by pressing the enter key 5 of the portable telephone 1, the menu item "preferences" can be entered. Comparing the display 2 of Figure 2 and the display 2 of Figure 3, it can be noted, that the icons are still arranged in the same successive circular order, but changed their places by one position. Starting from the arrangement of the icons shown in Figure 2, the circle of icon is turned in the counterclockwise direction by one position to arrive at the arrangement shown in Figure 3. This change of the icon position by one in the counterclockwise direction is achieved by turning the jog dial 6 of the portable telephone 1 shown in Figure 1 downwardly in the counterclockwise direction. Thus, the moving direction of the jog dial 6 results in a movement of the circularly arranged icons on the display 2 in the same direction. In case that a user starts from the arrangement of the icons shown in Figure 3 and wishes to position the icon "control" on position A, where it is enlarged and the corresponding menu item can be entered, he has to turn the jog dial 6 of the portable telephone 1 shown in Figure 1 in the clockwise direction, so that the icons also change their position by one in the clockwise direction.

[0028] If the user starts from the arrangement of the icons shown in Figure 3 and turns the jog dial 6 once in the counterclockwise direction, the icons change their position by one in the counterclockwise direction, so that an arrangement as shown in Figure 4 is achieved. In this arrangement, the icon for the menu item "divert" is displayed enlarged at position A and can be entered by pressing the enter key 5. If the user now wants to get from the arrangement shown in Figure 4 to the arrangement shown in Figure 2, he has to turn the jog dial 6 two times upwardly in the clockwise direction, so that the icons change their position twice clockwise.

[0029] The icon for the menu item "divert" is shown in three different sizes on the display 2 of Figure 2, Figure 3 and Figure 4, respectively. In Figure 2, the icon "divert" is shown on position D on the display 2, in Figure 3, the icon "divert" is shown on position E on the display 2, and in Figure 4, the icon "divert" is shown on position A of the display 2. On position D, the icon has a small size, on position E, the icon has a mid-size and on position A, the icon has the enlarged or biggest size. Comparing the Figures 2, 3 and 4, it can be seen, that on positions E and B, the icons show more details than on positions C and D, and the icons on position A consequently show more details than on positions B and E. Thus, the readability of a selected icon positioned on position A is much better than for the other icons. Further, since the respective successive or preceding icons on positions B and E are already displayed bigger than the icons shown on positions C and D, a user has a more detailed information on the next icons to be chosen.

[0030] In Figure 5, 6 and 7 the schematic views of the

displays 2 shown in Figure 2, 3 and 4, respectively, are again shown, whereby a respective text information on the enlarged icon on position A is added on a position F. Position F is located under position A on the display 2, so that a direct allocation of the icon with the text information on the respective menu item is ensured. The display 2 shown in Figure 5 displays the word "control" on position F, which corresponds to the menu item of the icon displayed on position A. On the display 2 shown in Figure 6, the word "preferences" is shown on position F, which corresponds to the menu item of the icon displayed on position A. On the display 2 shown in Figure 7, the word "divert" corresponding to the menu item of the icon shown in position A is displayed on position F.

### Claims

1. Terminal (1) for wireless telecommunication, with
  - a display means (2) for displaying icons (A, B, C, D, E) corresponding to menu items and other information,
  - a scroll means (6) for scrolling through icons (A, B, C, D, E) and highlighting a respective selected icon (A), and
  - an enter means (5) for entering a respective highlighted icon (A) to choose the corresponding menu item,
  - whereby at least some of all available icons (A, B, C, D, E) of a menu are displayed on the display means (2) at the same time and
  - whereby the scroll means (6) can be actuated to scroll through the icons (A, B, C, D, E) in at least two directions so that the respective selected icon (A) is highlighted depending on the actuation of the scroll means (6),

### characterized in,

that the respective selected icon (A) is displayed enlarged in relation to the other displayed icons (B, C, D, E), whereby the icons are displayed enlarged in their successive order in one of the at least two directions depending on the actuation of the scroll means (6).

2. Terminal (1) for wireless telecommunication according to claim 1,
  - characterized in,
  - that the icons (A, B, C, D, E) are displayed in a circular arrangement.
3. Terminal (1) for wireless telecommunication according to claim 1 or 2,
  - characterized in,
  - that by actuating the scroll means (6) the displayed icons successively change their position so that the enlarged display of a selected icon (A) is always lo-

cated at the same position on the display means (2).

4. Terminal (1) for wireless telecommunication according to claim 3,  
**characterized in,**  
that the position of the enlarged displayed icon (A) is located on a center position of the area of the display means (2) in which the icons (A, B, C, D, E) are displayed.

5. Terminal (1) for wireless telecommunication according to one of the claims 1 to 4,  
**characterized in,**  
that the preceding and the succeeding icon (B, E) to the actually selected icon (A) are displayed enlarged in relation to the other displayed icons (C, D) but smaller than the actually selected icon (A).

6. Terminal (1) for wireless telecommunication according to one of the claims 1 to 5,  
**characterized in,**  
that the scroll means (6) is a jog dial which can be rotated to scroll through the icons.

7. Terminal (1) for wireless telecommunication according to claim 6,  
**characterized in,**  
that the direction of the successive enlarged display of the selected icon (A) corresponds to the rotation direction of the jog dial.

8. Terminal (1) for wireless telecommunication according to one of the claims 1 to 7,  
**characterized by**  
a text display (F) of the menu item of the respective selected icon (A) on the display means (2) close to the position of the selected icon.

9. Method for displaying icons (A, B, C, D, E) on a display means (2) of a terminal (1) for wireless telecommunication, comprising the steps of

displaying icons (A, B, C, D, E) corresponding to menu items and other information on the display means (2),  
highlighting a respective selected icon (A), which can be entered to choose the corresponding menu item,  
whereby at least some of all available icons (A, B, C, D, E) of a menu are displayed on the display means (2) at the same time and  
whereby the icons (A, B, C, D, E) can be scrolled through in at least two directions by actuating a scroll means (6) so that the respective selected icon (A) is highlighted depending on the actuation of the scroll means (6),

**characterized in,**

that the respective selectable icon (A) is displayed enlarged in relation to the other displayed icons (B, C, D, E), whereby the icons are displayed enlarged in their successive order in one of the at least two directions depending on the actuation of the scroll means (6).

10. Method for displaying icons on a display means (2) of a terminal (1) for wireless telecommunication according to claim 9,  
**characterized in,**  
that the icons (A, B, C, D, E) are displayed in a circular arrangement.

11. Method for displaying icons on a display means (2) of a terminal (1) for wireless telecommunication according to claim 9 or 10,  
**characterized in,**  
that by actuating the scroll means (6) the displayed icons successively change their position so that the enlarged display of a selected icon (A) is always located at the same position on the display means (2).

12. Method for displaying icons on a display means (2) of a terminal (1) for wireless telecommunication according to claim 11,  
**characterized in,**  
that the position of the enlarged displayed icon (A) is located on a center position of the area of the display means (2) in which the icons (A, B, C, D, E) are displayed.

13. Method for displaying icons on a display means (2) of a terminal (1) for wireless telecommunication according to one of the claims 9 to 12,  
**characterized in,**  
that the preceding and the succeeding icon (B, E) to the actually selected icon (A) are displayed enlarged in relation to the other displayed icons (C, D) but smaller than the actually selected icon (A).

14. Method for displaying icons on a display means (2) of a terminal (1) for wireless telecommunication according to one of the claims 9 to 13,  
**characterized in,**  
that the scroll means (6) is a jog dial which can be rotated to scroll through the icons (A, B, C, D, E).

15. Method for displaying icons on a display means (2) of a terminal (1) for wireless telecommunication according to claim 14,  
**characterized in,**  
that the direction of the successive enlarged display of the selected icon (A) corresponds to the rotation direction of the jog dial.

16. Method for displaying icons on a display means (2) of a terminal (1) for wireless telecommunication ac-

ording to one of the claims 9 to 15,

**characterized in,**

that a text display (F) of the menu item of the respective selected icon (A) close to the position of the selected icon is displayed.

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FIG 1

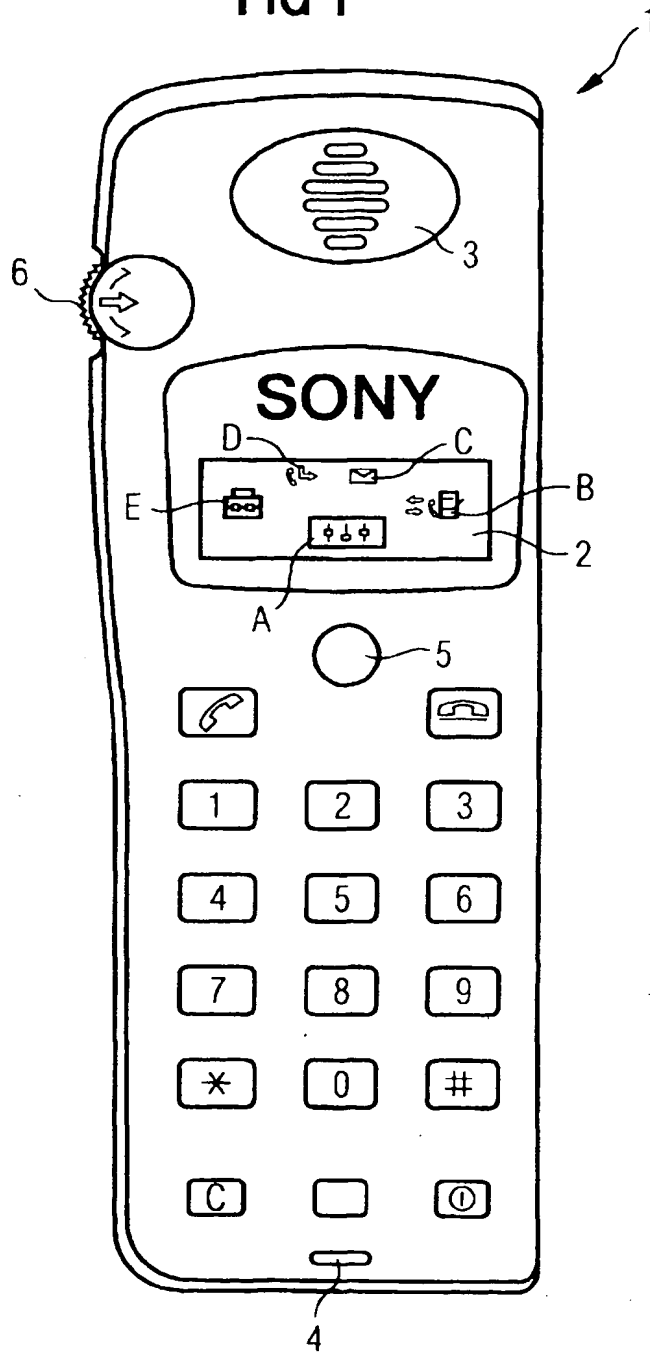


FIG 2

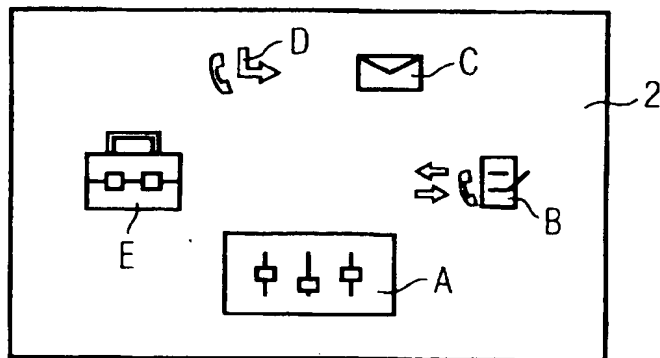


FIG 3

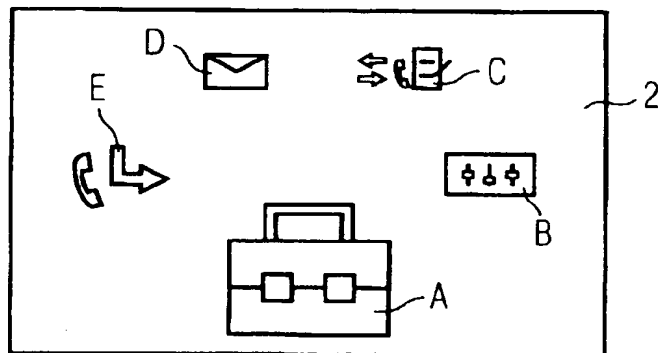


FIG 4

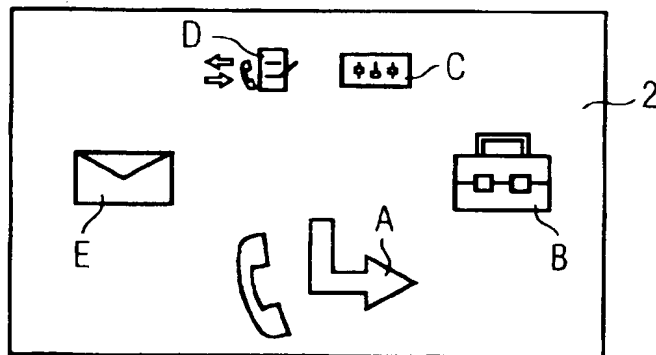


FIG 5

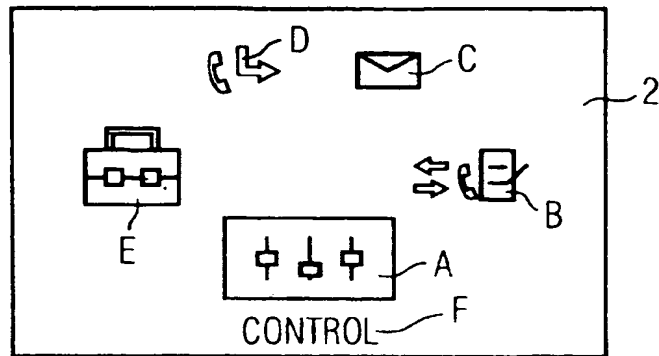


FIG 6

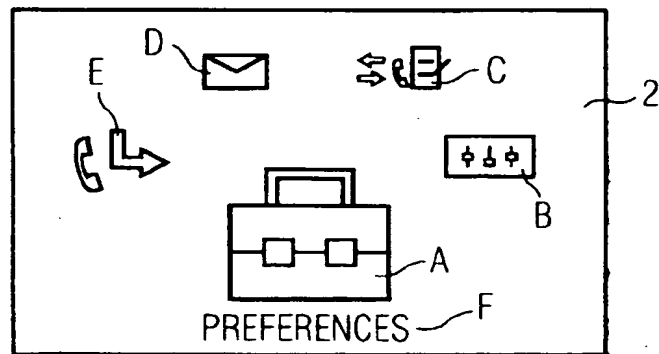
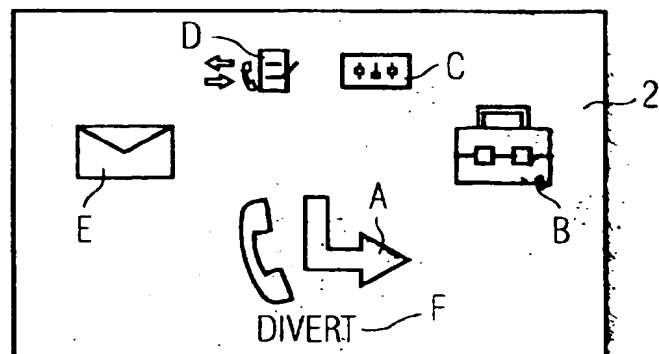


FIG 7





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 99 10 2617

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.6)
Y	WO 98 30004 A (ERICSSON GE MOBILE INC) 9 July 1998 * page 2, line 30 - page 3, line 15 * * page 7, line 1 - page 8, line 14; figures 2-4 *	1,8,9,16	H04M1/00 G06F3/033
Y	US 5 742 779 A (LEIFER LARRY J ET AL) 21 April 1998 * column 4, line 15-20; figure 1 *	1,8,9,16	
A	EP 0 727 730 A (IBM) 21 August 1996 * column 5, line 40 - column 6, line 3 * * column 6, line 37-54; figures 1-4 *	1,9	
A	EP 0 792 056 A (SONY CORP) 27 August 1997 * column 5, line 21-44; figure 1 *	6,14	
			TECHNICAL FIELDS SEARCHED (Int. Cl.6)
			H04M G06F
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>14 June 1999</b>	Examiner <b>de Biolley, L</b>
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 10 2617

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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14-06-1999

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 9830004	A	09-07-1998	AU	5727298 A	31-07-1998
US 5742779	A	21-04-1998	NONE		
EP 0727730	A	21-08-1996	US	5565888 A	15-10-1996
			JP	8263248 A	11-10-1996
			US	5736974 A	07-04-1998
EP 0792056	A	27-08-1997	JP	9233161 A	05-09-1997
			CN	1167390 A	10-12-1997
			US	5856827 A	05-01-1999

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